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Fig: 2.

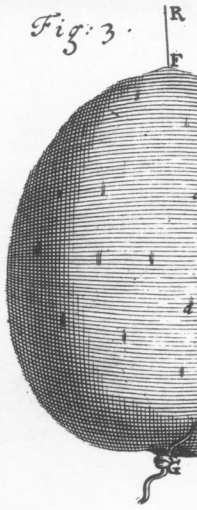
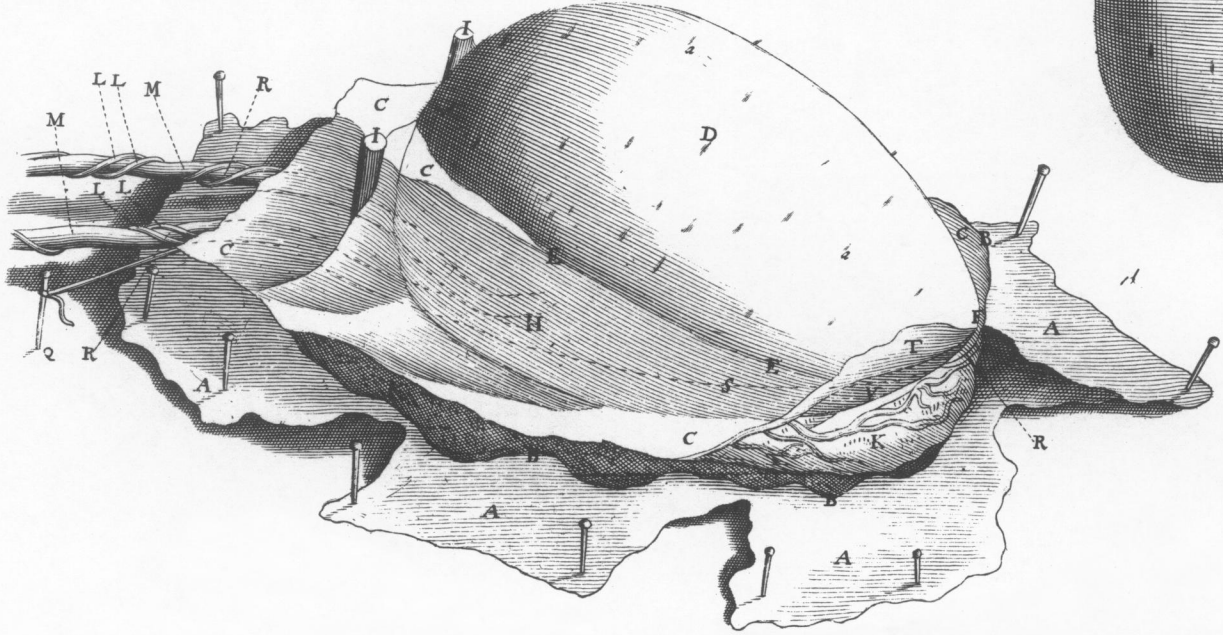


Fig: 1.

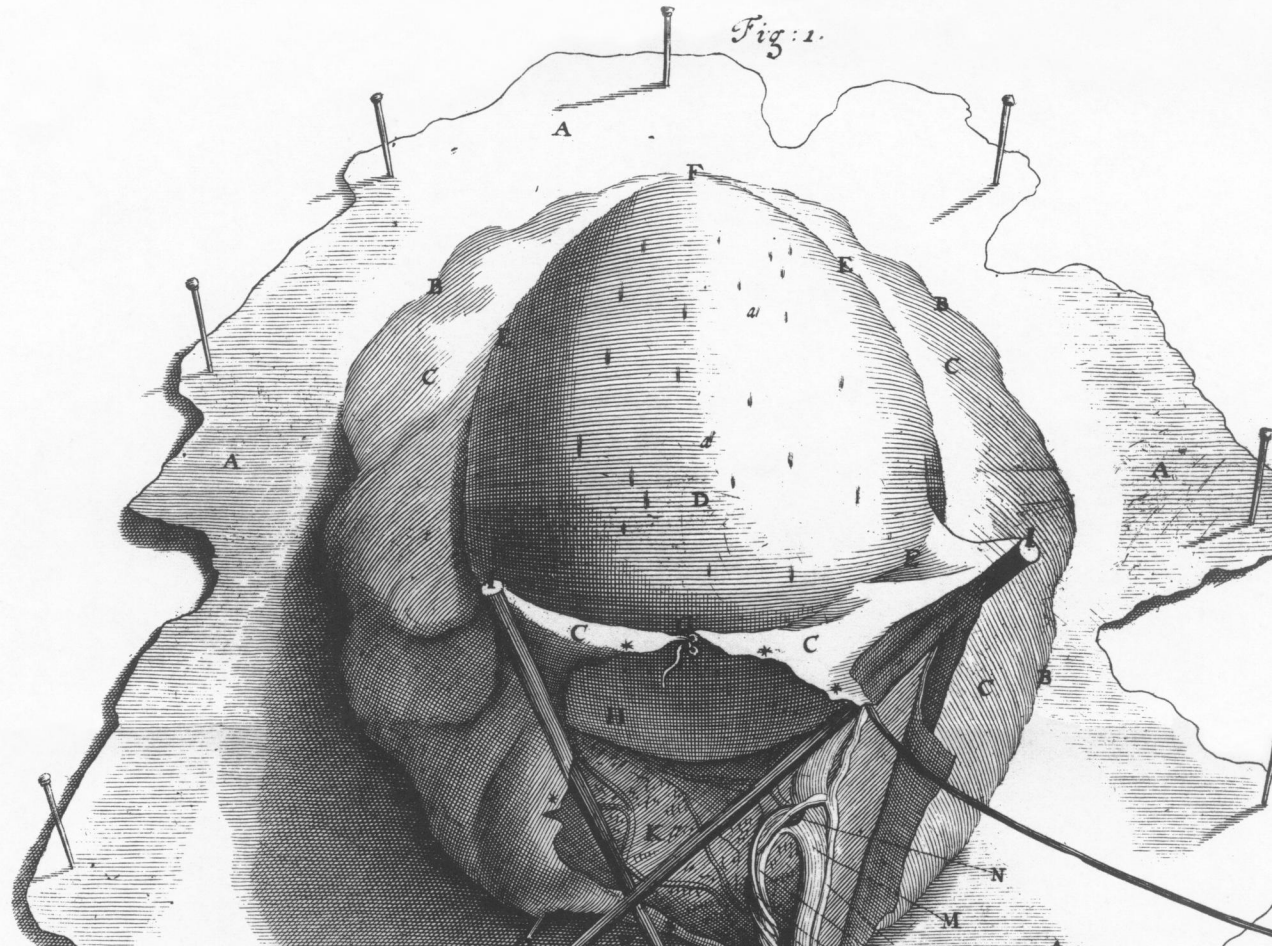


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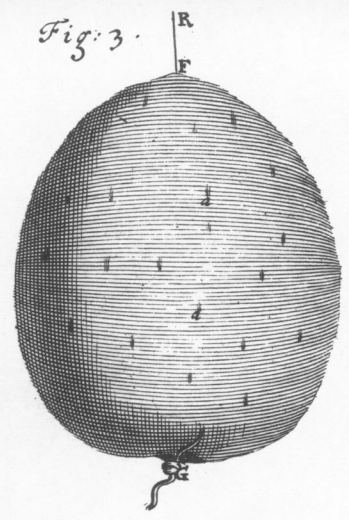


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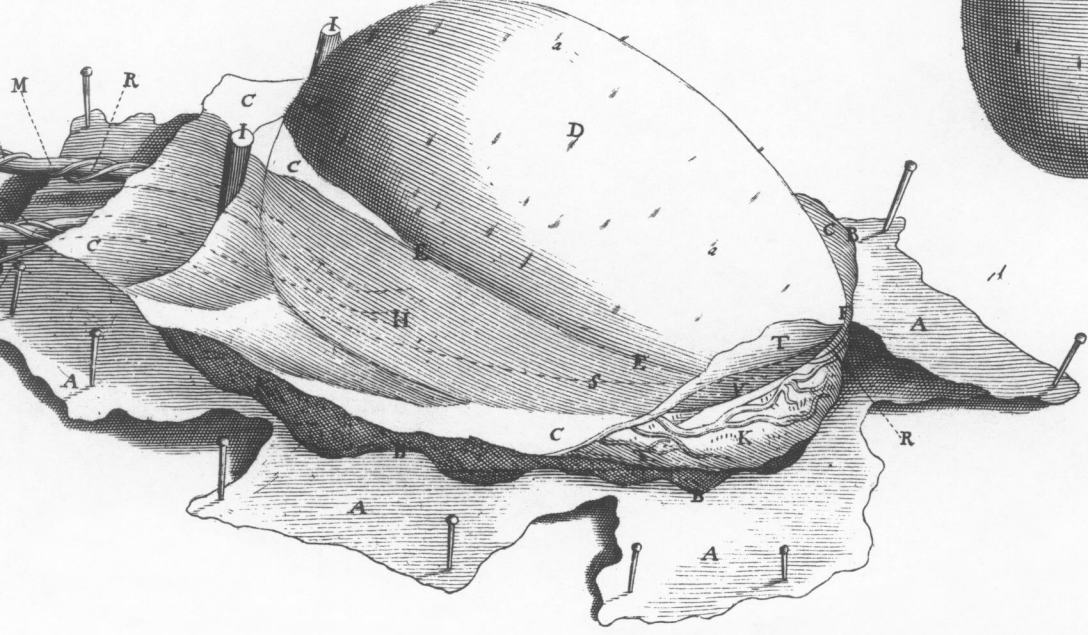
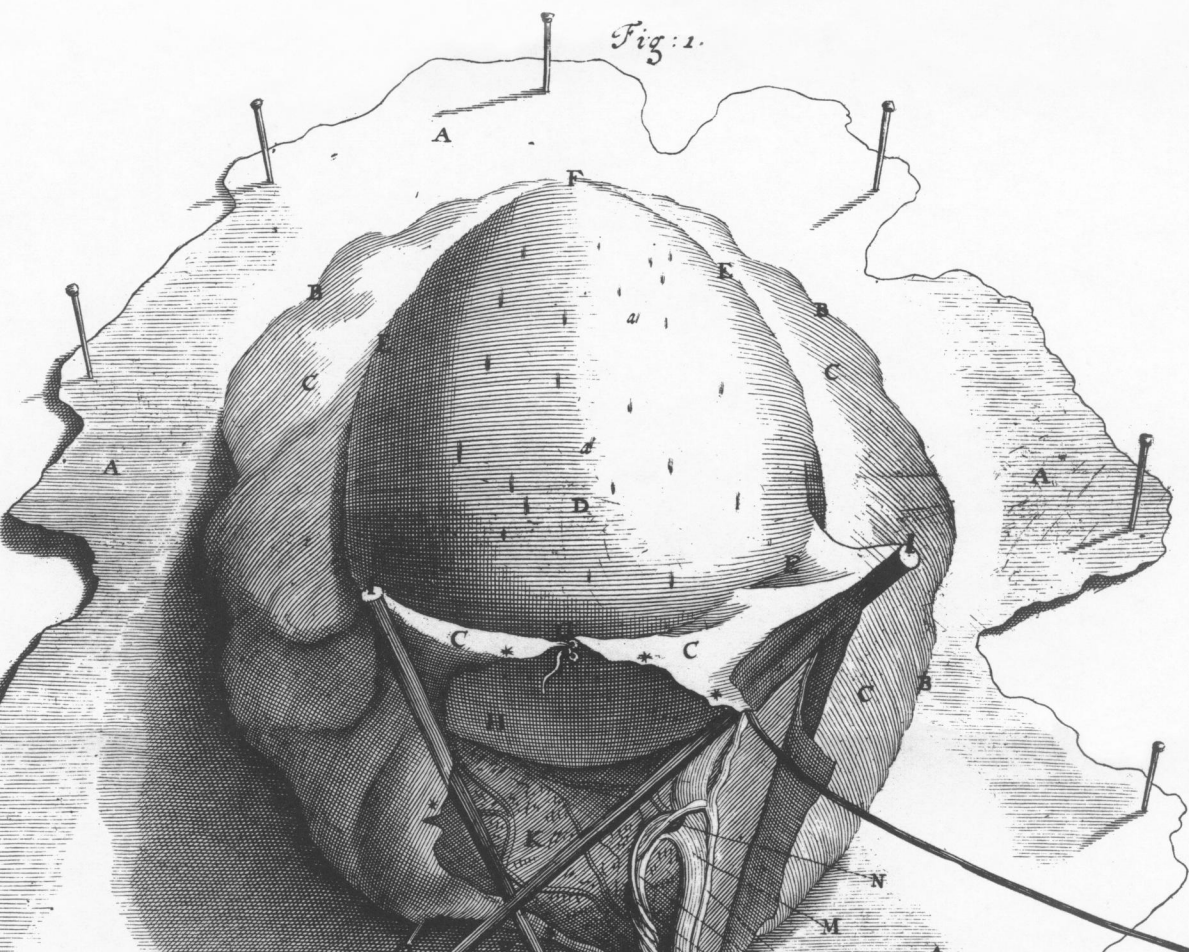
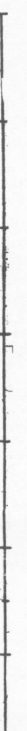


Fig: 1.



A Scale of Inches



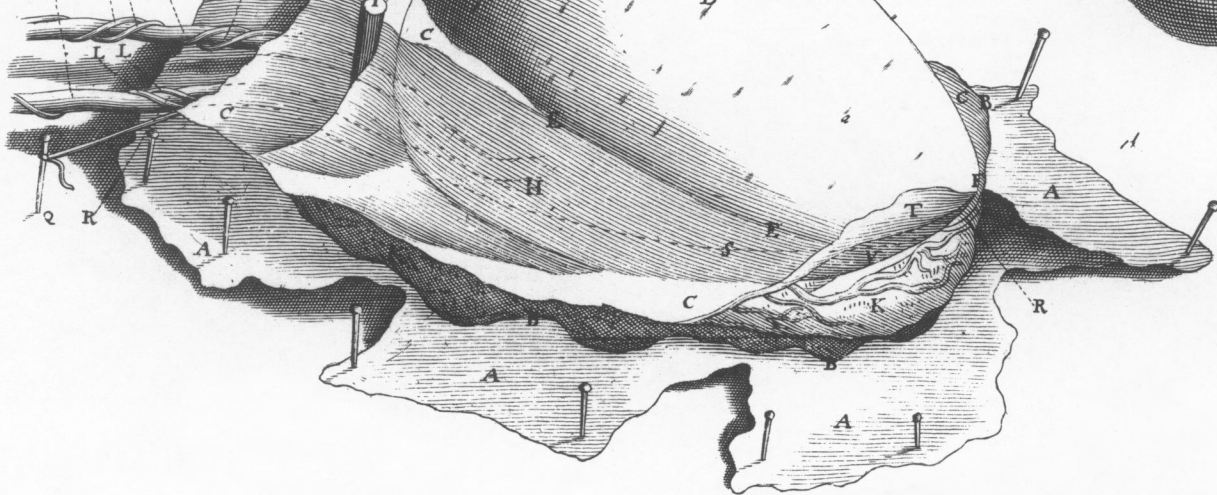


Fig: 1.

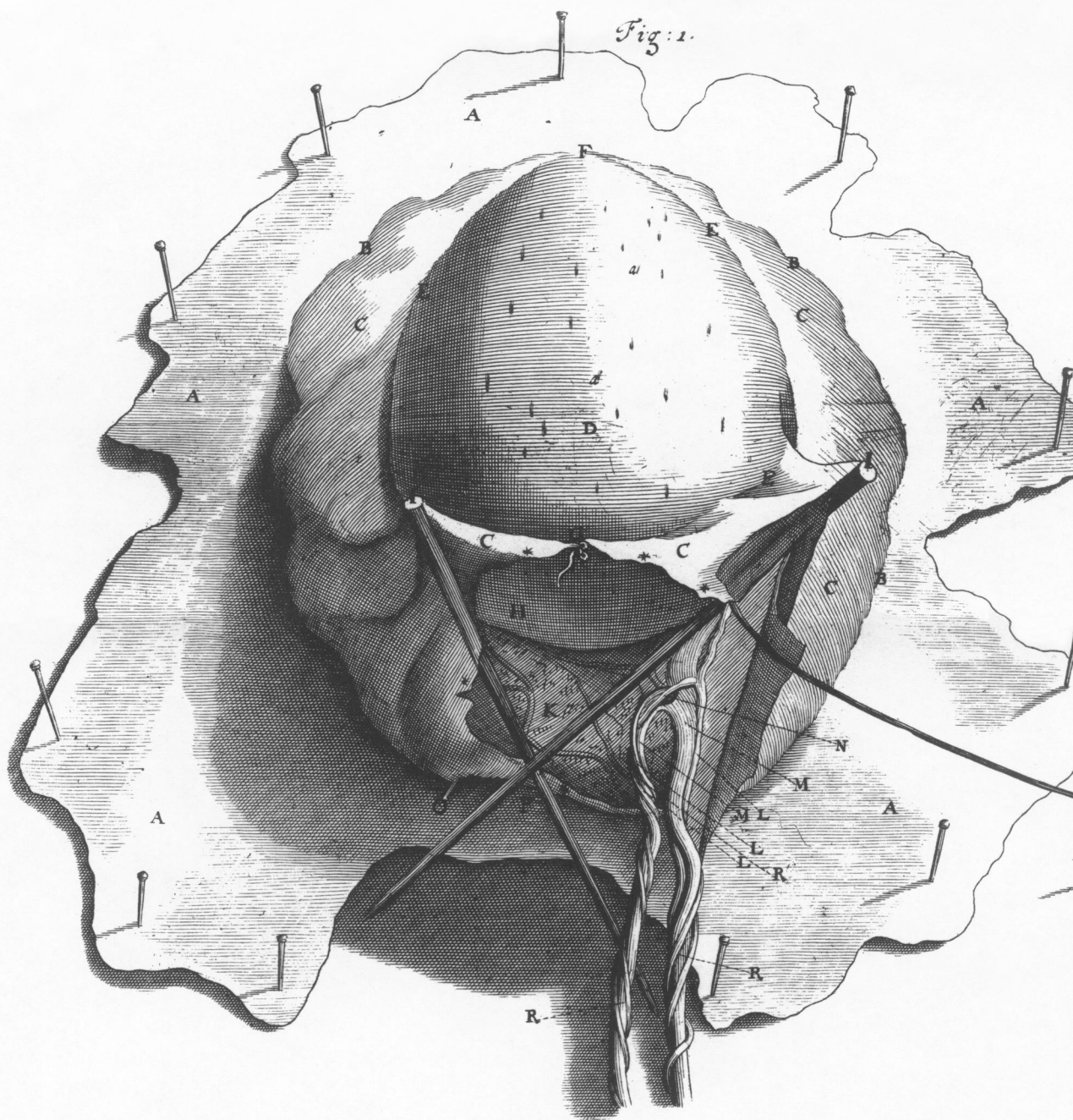
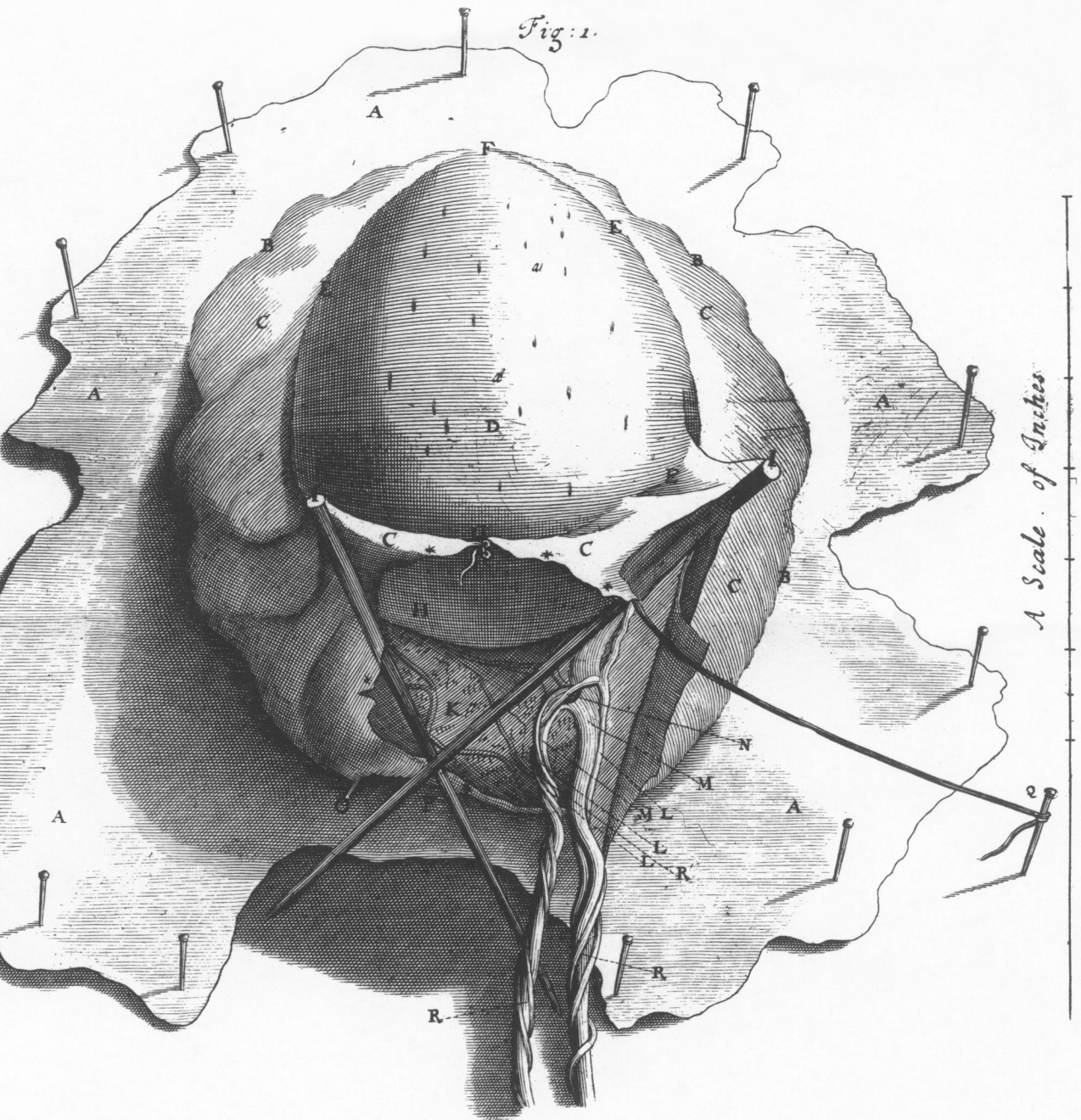




Fig: 1.



II. *The Humane Allantois fully discovered, and the Reasons assigned why it has not hitherto been found out, even by those who believed its Existence. With an Answer to their Objections, who deny it still. By Rich Hale, M. D. of Trinity College in Oxford. Communicated to the R. S. by Edward Tyson. M. D.*

NO point in *Anatomy* has been, and still is, more controverted by the greatest Masters of it, than the Existence, Shape, &c. of a Humane *Allantois*. I shall therefore give a true and exact account of it, as it appeared in two subjects, still by me. One of which I observed several years ago, and the other (*Fig. 1st.*) in *March, 1698*.

But before I do this, it may be convenient to shew, that no Anatomist had hitherto made an entire discovery of this *Membrane* ; and to take notice of the difficulties that have hindred such a discovery, even by those who believed the Existence of it ; and afterwards answer the objections of those who still deny it.

Most of the Antients indeed allow a *Humane Allantois*, not from their experience of it, but because they took it for granted, that Men and other Animals were, alike, in the *Viscera, Membranes, Vessels, &c.* Hence *Hippocrates* says, that Twins lie in *Sinus's*, and that the *Uterus* has *Cornua*. *Galen* describes the *Navel-string* to consist of four Vessels, besides the *Urachus*, and the *Allantois* to be like a Pudding reaching from one *Cornu* of the *Uterus* to the other. In short, notwithstanding the Antients might sometimes dissect Humane Bodies, and although (*a*) (a) Celsus. Præf. *Herophilus* and *Erasistratus* did open live Men and Women, yet it can't be found what great use was made of those

opportunities : For the accounts the Antients have left of many parts, particularly of the *Urachus* and *Allantois*, (as to its Name, Figure, Site, &c.) agree only to their appearance in *Brutes*. I shall say nothing of the *Allantois* in *Brutes*, since it is granted by most Anatomists, to be in these Animals, and sufficiently described by Dr *Needham*.

This excellent Anatomist also first discovered part of the *Allantois* in *Humane* subjects, but neither he, nor any other, has taken the right method of finding it entire, and 'tis no wonder they could not truly describe what they never saw. (b) Dr *Needham* says, that after the *Amnios* is cleared, and left fixed to the *Umbilical Rope*, you may divide by the fingers, or knife, the remaining part of the *Involucra* into two Membranes. The exterior he truly calls the *Chorion*, the interior he takes to be the *Allantois*. But by these ways of separation, you will presently tear the *Allantois*, and be able to discern only some small pieces of it. Besides, the *Allantois* is at first sight, so like the *Amnios*, that (c) many who suppose the *Amnios* double, and that its Coats are easily separable, have taken these pieces of the *Allantois*, for broken parts of one of the Coats of the *Amnios*. Whereas having first found the Hole whence the Urine came forth (if the *Allantois* is not too much torn) you may blow up the *Allantois* with a Pipe to its full dimensions, and then see its true Shape, the *Fundus*, the *Crevix*, the insertion there of the *Urachus*, its relation to the other Membranes, &c. Be the *Allantois* never so much torn, yet this way you may easily separate many Inches of it, from the *Chorion*, and *Amnios*. Which easie separation demonstrates a distinction of Membranes, since no double Membrane can be divided by the breath alone.

Indeed *Hoboken* and (d) *Diemberbroeck* make it a very easie thing to separate the *Allantois* from the other Membranes, only by the fingers ; but 'tis plain from their de-

(b) cap. 3d
7th.

(c) Diemer
li. 1. cap.
31. Horn.
parag. 69.

(d) Li. 1st
cap. 31.

descriptions that they never saw one entire. Amongst other mistakes (e) *Diemerbroeck* says that the Urine of a *Fœtus* lies between the *Urinary* Membrane and the *Chorion*; as though not contained in a distinct Bladder, but in a Cavity made partly from the *Chorion*, partly from the *Urinary* Membrane. (e) de Mul. Org. cap. 15.

I confess *De* (e) *Graaf* tells us, that by blowing with ^{15.} a Pipe into a Hole made through the *Chorion*, all the Membranes of the *Secundines* will appear distinct. He has also delineated an *Allantois*, with the other Membranes, &c. as he says he found them. Yet this (f) *Fig.* (f) cap. 15. Tab. 22d. must have been drawn from his own fancy, and not from any preparation, for these reasons. 1st, Because, by this way of separation, you can only part the *Allantois* from the *Chorion*, but never see its true dimensions, nor any appearance of a Bladder; for a Bladder, as the *Allantois* is, can be shew'd only by blowing into its Cavity, or by finding it full. Yet in this *Fig.* no sign can be observed, where 'twas blown up, and tied, *De Graaf* also speaking of making a Hole only in the *Chorion*. Nor can this *Allantois* be supposed full of Urine, because 'tis not of the Shape of a full *Allantois*, and our Author himself calls it only the inflated part of the *Allantois*. However, I can't conceive how the *Allantois* could remain partly filled with Air (any more than it might with Urine) so long as till this *Fig.* was drawn, unless some Hole was tied up, whence the Urine came forth, and the Air was blown in. 2dly, Because in this *Fig.* the *Umbilical Rope* seems to run through both *Amnios*, and the *Allantois*, to its insertion on the *Placenta*. Whereas the *Allantois* is nowhere perforated by the *Umbilical Rope*, nor does it anywhere pass through the *Amnios*, but only runs under it, at the place of its insertion on the *Placenta*. If the *Navel-string* could be allowed to enter the *Amnios* at (g) I, and to (g) Tab. 22d De Graaf pass under it to the *Placenta*, why should it not appear (which it does not) under the *Amnios*, as well as the

thin substance of the *Allantois* ? Again, according to *De Graaf's* position of the *Secundines*, (which is the reverse of *Fig. 1st*, where the *Navel-string* lies under the *Allantois*) nothing could hinder a plain view of the place where the *Navel-string* is set on to the *Placenta*. This will be easily apprehended, by supposing the part *H* in my 1st *Fig.* to lie uppermost, the *Fundus G* and *Navel-strings* being turned over ; for then the *Strings* will run over the *Allantois*, as in *De Graaf's* Cut, and its insertion appear plain on the *Placenta*, which yet can't be discovered in his (g) *Fig.* I am sure the whole is irregular, and I take it to be fictitious. As for the *Urinary* (g) Membrane *G* it seems to be the *Allantois* of a *Colt* (where (b) *Needham* says, the *Umbilical Rope* runs through the *Urinary* Membrane) not less absurdly added to the *Secundines* of a *Humane Fœtus* than the *Secundines* of a *Whelp* are to a like *Fœtus* by *Vesalius*.

Lastly, 'Tis most evident that *De Graaf* knew nothing of the true Shape of this Membrane, and that he had never seen one entire, because (i) he consents to (i) *Needham's* description of it as true, which yet is false in several particulars. For 1st, the *Urinary* Membrane does not cover the whole *Fœtus* (as he affirms) but only that part of it, which respects the *Chorion*, and does not lie on the *Placenta* ; for the *Allantois* can be extended at farthest but to the edges of the *Placenta*, where the *Amnios* and *Chorion* are so closely joined by *Fibres*, that no Membrane can come between them. Wherefore 2dly, the the *Allantois* is not every where fastned to the *Chorion*, And consequently 3dly, the *Allantois* can't be of the same Shape that the other Membranes are of, nor be like the *Allantois* of a *Colt*, which contains the *Fœtus* in the *Amnios* ; all which nevertheless (k) *Needham* asserts. In short, Dr *Needham* had seen only pieces of the *Urinary* Membrane, but never an entire one, and so could only guess at the Shape, &c. of it, from what he had observed

(b) vid. B.
Tab. 2. l.

(i) De Gra.
ca. 15.
(i) cap. 3d
de format
fœt.

(k) cap. 7th

served in *Mares*, and *Glanduliferous* Animals. He might have made a better guess at the figure, site, &c. of a *Humane Allantois* from that of a *Whelp*, which does not every where encompass the *Fætus*, as he observes.

Bidloe in most of his *Figures* of the *Secundines*, letters some *Vestigia* of the *Urinary* Membrane, but in any of these *Figures*, you only see broken pieces of one, so confusedly placed, that no *Idea* of its Bigness, Shape, or Situation can be formed from them. I must confess that oftentimes the Membranes of the *Secundines* are so torn, that no Art can exhibit an entire *Allantois*. However, among the many *Secundines* that have come under the hands of Anatomists, several no doubt must have been entire enough for a fuller discovery than they have made, had it not been by their ways of proceeding (*viz.* by knife, fingers, or blowing under the *Chorion*) impossible to discover any thing plain, or satisfactory, even in the the fairest subjects.

I come now to answer the objections of those who still deny an *Urinary* Membrane to a *Humane Fætus*,

The difficulty of finding this *Membrane* is by no means an argument against the existence of it: But a Woman that dies big with Child is so fair a subject for the discovery of *three Membranes*, that I wonder (*l*) *Parey* having such an opportunity could find but two, if he was so careful as he says he was. The accurate Dr *Tyson* observed *three Membranes* some years ago, in a like subject. After the *Chorion* was divided, and laid aside, he saw *two Bladders*, containing Liquors of different colours, which he pressing one towards the other, did not mix, but remained distinct. This observation fully satisfied that great Anatomist, to as the existence of an *Allantois*; and its figure, texture, site, &c. might also have been discovered by him, had not the less curious Spectators been impatient to pass on to other parts of the Dissection.

(*l*) Lib. 3.
cap. 34.

- Some deny a *Urinary Membrane* to a *Humane Fœtus*, because they suppose the *Urachus* to be impervious, and that therefore there would be no passage for the Urine, consequently no need of an *Allantois*. (m) *Needham* indeed says that he could never find any sign of a Cavity in the *Urachus*, yet is of opinion, that by blowing from the *Bladder*, the Air might be forced through a *Humane Urachus*, as easily as he has often done it through that of a *Whelp*. I don't understand why Dr *Needham*, and (n) others should insist so much upon an apparent Cavity in the *Urachus*, or expect that air should necessarily pass through it upon blowing, and think that otherwise it cannot be fit for the assigned Office ; since many Bodies, as Membranes, &c. will not admit Air, &c. yet let Water pass freely through them. It will not seem strange, that Water should pass through the substance of the *Urachus*, if we consider that the Cavity of the *Urachus* to the *Navel* is open, as appears by Inflation, or Injections, (to say nothing of those who are mentioned to have made Water by the (o) *Navel*) and that the rest of the *Urachus* is pervious, tho' not plainly hollow, (the Urine rather soaking gently, than running through its more strait Tubes) may be gathered from hence. 1st, That the substance of the *Urachus*, (as well as the Cavity of the *Allantois*) is always found turgid with a Liquor, that in colour, taste and smell, seems Urinous. 2dly, That since the *Mucous Coat* of the Intestines is demonstrated to be vascular by Mr *Leeuwenhoeck*, therefore the Mucous substance of the *Urachus* may also be Vascular. 3dly, That Urine may as easily ouze through these Mucous Vessels, as other fluids run through Vascular *Cartilages*, and *Bones*, &c. or the Chyle into *Lacteals*, whose Orifices as (p) *Leeuwenhoeck* observes, will scarce admit of Particles so big as the 1000000000 part of a grain of sand) the great Cavity of the Intestines being open at the same time ; or as easily as grosser parts of the *Semen* pass the Tubes
- (m) cap. 3^d
cap. 4th
cap. 7th.
- (n) Parey
Lib. 3^d.
cap. 34.
Mauricau
Lib. 2^d
cap. 4th
- (o) Fern..
Lib. 6. cap
13.
Senn. Lib.
Prac. 3^d
part 8. sect.
2d cap. 10.
Lauren.
Lib. 8th
Quest. 17.
- (p) Vol. 2^d
Epist. 68.
pa. 235.

Tubes of the *Testicles*, whose Cavities are not more perceptible. I am sure the Urine is more assisted in its motion by the *Detrusor Urinae*, &c. than any of these Fluids can be by the *Heart*, or other *Muscles*.

(q) Others will not admit of an *Urinary Membrane*, (q) Barth. Lib. 1. cap. 36. & 37. Riolan. Lib. 6. cap. 3 & 4. Parey Lib. 3d cap. 34. they thinking it would be useless, because they imagine, that when the Bladder is full, the Urine must be discharged at its *Cervix*, and not at its *Fundus* by the *Urachus*. But in answer to this, the Urine can never pass through the *Cervix*, and *Urethra*, unless the *Abdominal Muscles* contract, because we never void Urine naturally,

but by the help of these Muscles, nothing less being able to force open the *Sphincter Vesicae*. Now it being more than probable that these Muscles never act before *Respiration*, no Urine can pass through the *Sphincter*, before the Child breathes. No reason can be given why the *Abdominal Muscles* of a *Fœtus*, should voluntarily contract, since neither the Quantity nor Quality of the

(r) Urine can excite to such an action. For when the Bladder is too full of Urine, it will ouze through the lax spongy substance of the *Urachus*, being gently pressed by the *Detrusor* alone. There would arise many inconveniencies from the voluntary contraction of the *Abdominal Muscles* of a *Fœtus*, as voiding *Fæces* as well as *Urine*, into the *Amnios*, which would be more prejudicial than

(s) Sweat, &c. Yet if we should suppose the *Abdominal Muscles* of a *Fœtus* to act, the Urine will however pass where it can most easily i.e. through the *Urachus*, which is partly open, and altogether of such a Texture, as in no wise can hinder the passing of the Urine, much less be able to resist a considerable force, as the (t) *Sphincter Vesicae* can. Besides, the *Urachus* is not only thus qualified, for the admission of Urine, but when the Mother lies down, 'tis almost upon a Level with the *Urethra*, and what has once passed the *Urachus*, cannot return by reason of the

Length, Situation, and peculiar Structure of it. Lastly, the

(r) Barth. Lib. 1. cap. 37. Need. cap. 3. pag. 81.

(s) Harv. de Humor. pag. 547.

(t) Gal. de usu. part. Lib. 15.

(d) Senn. the (v) *Pudendi Clausura* sometimes happening in both
 Prac. Lib. 4. part 1. Sexes, demonstrates that then at least, the Urine can't
 sect. 1. cap. pass through the *Urethra*.

1. cap. 3. (w) *Dioni* not finding any *Allantois*, nor an *Urachus*
 Mauric. Lib. 2. cap. plainly pervious, thinks there is no need of either, on an-
 3. other account. For he supposes that the Blood, which
 (w) pag. serves for the Nutrition of the *Fœtus*, is depurated from
 145. all Excrement. But I cannot apprehend, what should
 make this portion of the Blood and Chyle freer from Ex-
 crement, than the rest of the *Massa Sanguinea*. There is
 indeed no portion of it, which does not contain parts un-
 fit for *Assimilation* and *Nutrition*. Our Author would
 have been convinced of this error, had he ever opened
Abortions of five Months old or upwards, their Bladders
 being always full of *Urine*, and some *Fœces* constantly in
 the Intestines. 'Tis difficult to determine when this sepa-
 ration of *Urine* first begins, but I am apt to think it much
 sooner than is generally supposed. Fig. the 3d is the
Allantois of a very small *Abortion*, which I have still by
 me. Since all the parts are perfectly formed before *Im-*
pergnation, not very long after Impregnation they may be-
 gin to perform their Offices. No doubt they begin as
 soon as there is occasion for any separation, and a sepa-
 ration of *Urine* is necessary, when the *Fœtus* is first
 nourished by the *Umbilical Arteries*.

(x) Aqua- The Existence of an *Allantois* is denied by (x) some
 pend. Lib. who grant an *Urachus*, but will have it convey the
 1. cap. 7. *Urine* to between the *Amnios* and *Chorion*. (y) *Die-*
 Fallop. (y) Lib. 1. *merbroeck's* opinion is somewhat like this, only he would
 cap. 31. have the *Urine* lodged between the *Urinary* Membrane
 (z) Harv. and the *Chorion*. These men don't consider that the
 deHum. & *Urine* in this case would get into the *Amnios*, as well as
 membra. the *Succus Nutritivus* of the *Chorion*, whether imbibed
 Needh. cap. 2. 3. from the *Uterus* by the *Chorion*, or separated by its
 cap 7. *Glands*. Such a *Succus Nutritivus* of the *Chorion* is grant-
 Barth. Lib. ed by the (z) Maintainers of the fore-cited opinions, as
 1. cap 36. well
 Graaf de mul. org. cap. 15.

well as by those who deny an *Allantois* altogether, or (a) suppose it to have a different Figure, &c. from what (a) Needh. Graaf. *Diemerbroeck* assigns it. The Transudation (or Filtration through the Membranes) of this *Succus* seems most likely in *Mares* and *Sows*; for in a (b) *Mare*, the *Chorion* is not (b) Harv. de Membran. joyned to the *Uterus*, till she is half gone, and in a (c) *Sow* it does not adhere to the *Uterus* till near the end of (c) Needh. cap. 2. cap. 3. and 7. Graaf de mul. org. cap. 45. her going with young. But 'tis most evident that the Urine of a *Humane Fœtus* is not contained between the *Chorion* and *Amnios*, nor between the *Chorion* and *Allantois*, from the close connexion of these Coats to one another; also from the observation of Midwives, who often find a Bladder of Water (they call it a *By-Water*) offering it self before the *Child*, whereas the Humour of the *Amnios* is little, and of the *Chorion* much less, and of another Colour, &c. at the time of *Birth*. This *By-Water* is taken notice of, as an argument for an *Allantois* by Mr *Comper*, to whose assistance we owe that the Figures belonging to these Papers appear correct.

The great (d) *Harvey* will not allow an *Allantois* even (d) Harv. de memb. & humor. to *Brutes*, and fancies the *Allantois* and the *Chorion* to be the same Membrane, that has two names, the first from its shape, the other from its office, or number of Vessels. Yet 'tis plain from *Galen* and all the Antients, that they meant two distinct Membranes by the *Allantois* and *Chorion*. Dr *Harvey* thinks that a *Fœtus* does not void Urine, but that the Bladder contains it, till the time of *Birth*. What was offered against *Dioni's* Opinion may serve for an answer to this also. Because 'twas impossible for this diligent Anatomist not sometimes to observe an *Urinary Bladder*, he has thought of ways to explain such *Phænomena* without granting an *Allantois*. In (e) *Sheep* and (e) Harv. de memb. & humor. *Does* he had seen as it were a certain *Process* between the *Umbilical Arteries* full of Urine. This *Process* is no doubt the *Allantois*, though (f) *Bartholinus* calls it the (f) Lib. 1. cap. 37. *Urachus*. Again, he thinks what is called by others an

Allantois (if it is not the *Chorion*) is some Coat accidentally formed from a Reduplication of the Membranes: because (since every Membrane is double) Nature may upon a streight, lodge the Urine between a *Duplicature*. Yet he does not tell us how *his Duplicature* is to be filled, he allowing no *Urachus*. But, in short, this *Urinary Bladder*, can be no *Duplicature* of the other Membranes, since in all Animals it differs from them, as to Figure, Texture, and in having an *Urachus*, which no other Membrane has. And since every Animal that has a Bladder, must have a like-necessity for a Receptacle of Urine till born, since also the *Urachus* is ever alike inserted in the same *Species* of Animals, and the *Urinary Bladder* constantly the same, as to Shape, Texture, Situation, &c. the *Urachus* and *Allantois* with its (g) *By-Water* can be no accidental or preternatural things.

(g) Hart
de Hum.

All the material Objections, and Difficulties about an *Humane Allantois* being thus cleared, I shall now consider what has been, or may be, offered against these *Figures* in particular; when I have first given the Explication of them. And I think there is no need of any other account thereof, since 'tis not my design to give an entire History of the *Secundines*, &c. or repeat what can be found in other Anatomists; but only to relate what I have discovered of an *Humane Allantois*, *Amnios*, &c. which is altogether new, or different from the Observations of others..

Fig. I.

Represents the *Secundines* of *Twins*, to shew the *Allantois*, and its Relation to the other Membranes, &c. after the parts were prepared and dried.

A A A A Part of the *Chorion* expanded.

B B B a *Line*, expressing the edges of the *Placenta*.

C C C the *Amnios*, which is united to

D. the *Allantois*, at

E E E the *Line of Union*.

F the

F the *Cervix* of the *Allantois*.

G a *Hole* at the *Fundus* of the *Allantois*, whence the *Urine* came forth, and where the *Allantois* was blown up.

H Part of that half of the *Allantois*, which lies under the *Line of Union*, and immediately covered the *Fœtus's*, unless it is supposed that the *Amnios* is continued under the *Allantois*.

I I Two *Stiles* or *Probes* thrust under the *Amnios*. They support the *Allantois*, and keep open the *Aperture* * * * of the *Amnios*, whence the *Twins* came forth.

K Part of the *Placenta*, with some *Blood-Vessels* injected.

L L L L the *Arteries* of the *Navel-string* filled with *Red Wax*.

M M The *Umbilical Veins* filled with *Green Wax*.

N a *Communicant Artery*, by means of which all the *Arteries* of both *Navel-strings* were filled at once, and the *Veins* were filled by one *Injection* in like manner.

O a *Pin* that keeps out the *Amnios*, where from the edge of the *Placenta* it runs partly to the *Line of Union*, or *Adhesion*, and partly over the *Placenta*.

P Part of the *Chorion* at the edge of the *Placenta*, where it runs under the *Amnios* on the *Placenta*.

Q a *Pin* that by a *thread* helps to pull open the *Aperture* of the *Amnios*.

R R R the *Urachus*, lying between the *Arteries*.

a a a a *Fibres* or *Vessels* which fasten the *Allantois* to the *Chorion*.

Fig. II.

Exhibits a side-view of the same Preparation, that the *Insertion* of the *Urachus*, &c. may be better seen.

N. B. That A and all the same Letters in these three *Figures* denote the same Parts in every one.

S shews the Course of the *Urachus* R at F in pricked lines.

T. part of the *Amnios* raised from the edge of the *Placenta*, to discover the *Placenta* K and V.

V. that part of the *Allantois* which is below the *Line of Union*, near its neck F.

Fig. III.

Shews an entire *Allantois* of a very small *Abortion*.

N. B. This *Allantois* was easily separated from the other Membranes between which it lay; and the *Amnios* remained an entire *Bladder* or Membrane under the *Allantois*.

Now some to whom I have communicated these *Figures* object, that what is called the *Line of Union* can be on real thing.

As to this I don't know whether the *Allantois* of *Twins* may not require such a conjunction to sustain, and keep steadily a greater quantity of *Urine*: nor can I resolve whether the *Allantois* of *Twins* (like that of a single *Fœtus* in Fig. 3.) may not be distinct, and separable from the *Amnios*, but was not discovered by me to be so, through want of skill or care. However, the reasons why such a *Line* was figured are these. 1. Although I used more force, with equal care, to separate the *Allantois* from the *Amnios* in this place than in any other (where nevertheless the separation was very easie) yet I couldn't divide these Membranes farther than that *Line*. 2. This *Line* seeming so regular as to divide the *Allantois* into two equal parts, I could not take it to be the effect of Chance, or my Separation. 3. The Part H below the *Line* E E was alike in *Transparency* to that part of the *Allantois* D above it. Whereas had the *Amnios* been still joyned to the *Allantois* (as these Objectors suppose) the *Allantois* below this *Line* must have appeared thicker than that part above it; since the *Amnios* alone is much thicker than the *Allantois*. 'Tis easie indeed to conceive the *Amnios* running an entire
Bladder,

Bladder, or Membrane, under the *Allantois*, and perhaps it may be so: but I think it disingenuous to conceal what I did observe, or to make out by fancy, what I couldn't discover in fact.

Others have thought this *Allantois* to be an *Amnios* of one of the *Twins* belonging to these *Secundines*. This Objection, though it may seem plausible, yet is of no force. For 1st, this *Allantois* is much finer to the touch, and also much more transparent, than the other *Amnios*; which still remains stiff, whilst the much thinner *Allantois* sinks upon the least blast of Air, notwithstanding the stiles I I which assist it. 2^{dly}, This *Allantois* had two visible *Urachus's*, and it is of an Oviform Figure, somewhat like the common Cuts of a Mans Bladder (for a true Cut of a *Humane Bladder* I never yet saw, for it ought to be made much bigger (as it really is) at its *Crevix*, &c.) Also this *Allantois* no where touches the *Placenta*, unless at the Neck F. But on the contrary, the *Amnios* is of the same irregular Figure, as the Position, Motion, &c. of the *Fætus* require. Likewise, it covers the whole internal surface of the *Placenta*. 3^{dly}, They who make this Objection must suppose some *Hole* in this Bladder, and in the *Amnios*, through which one *Umbilical Rope* may pass from the *Placenta* to the *Fætus*. But such a *Foramen* would be preternatural, because the *Navel-string* only runs from the *Placenta* to the *Fætus*, under a *Coat* taken from the *Amnios*, and lyes with the *Fætus* in the Cavity of the *Amnios*, that is no where perforated, 4^{thly}, The *Hole* at the *Fundus G* was scarcely wide enough to receive the end of a mans finger, whereas the *Twins* did not want six weeks of their full time. Since therefore a *Fætus* of near eight months could not possibly pass this *Orifice*, this Bladder could not be an *Amnios*.

Nothing in these *Secundines* is preternatural, only some things were not before observed. Hitherto Anatomists have not allowed *Twins* to lye in a common *Amnios*

nios, but supposed each *Fœtus* to have a distinct *Amnios*. The reason of this Opinion might be, that some denying any *Urinary* Membrane, called every Membrane they found (except the *Chorion*) an *Amnios*, and these finding two Membranes in the *Secundines* of *Twins*, supposed

(b) Mauriceau Lib. 2. cap. 4. Need. cap. 2. Barth. Lib. 1. cap. 36. Diemerb. Lib. 1. cap. 30. (i) Diemerb. Lib. 1. cap. 31. Graaf cap. 15. the like number ?

them to be two *Amnios's*. That others, granting an *Allantois*, but not distinctly discovering it, but only two Membranes, also imagined them to be two *Amnios's*. Both of these taking that for an *Amnios*, which might really be an *Allantois*. But since one *Chorion*, and one (h) *Placenta* (the (i) *Placenta*, and (i) *Chorion* being ever of the same number) generally serve *Twins* (nay, sometimes three *Fœtus's*) why should it seem strange, that one *Amnios* (at least sometimes) and one *Allantois* should serve

(k) Mauriceau Lib. 2. cap. 3. and 4. (l) Diemerbroeck think there is an absolute necessity for every *Fœtus* to lie in a distinct *Amnios*, and that otherwise *Twins* in the same Membrane would grow together, and make a (m) *Monster*. (m) *Aquapendens* further says, that all *Ova Gemellifica* produce some other sort of *Monster*. Yet 'tis most certain that *Ova Gemellifica* do exclude two perfect *Chicken*, however not both alive. (n) The Great *Harvey* indeed thinks it possible, that such an *Ovum* may produce a monstrous *Chick*, if its *Vitelli* are contained in the same Membrane, &c. yet does not positively say it must be so. For my part I can't see any more reason why *Twins* in one *Amnios* should grow together, than that the *Hands* or *Heels* of the same *Fœtus* should grow to its own Body. How can the Humors that lubricate a single *Fœtus*, and help it to move, joyn two together ? since the Humours as the same, and the parts of the same *Fœtus* as tender as those of *Twins* are, and lye as close to one another, as *Twins* do. 'Tis very observable, that among all the *Monsters* we read of, there are very few, which seem to be made of two entire Bodies joined together, and that most

most of these upon (o) Dissection were found to have ^{(o) Parey} but *one Heart, one Liver, &c.* whence 'tis most plain, ^{Lib. 25.} that these *Monsters* (and no doubt all others) were origi- ^{cap. 2.} nally *Monsters* in the *Ova*, before Impregnation, and not so from want of an the *Amnios*. Yet (p) *Diemerbroeck* does ^{(p) Diem.} not a little boast of having first (as he thinks) found the ^{Lib. I. cap. 30. and 31.} reason why *Twins* must lie in distinct *Amnios's*. But since the matter of fact (sometimes at least as in these *Secundines*, where there was only one *Amnios*, and two regular *Fetus's*) is not true, his argument for a necessity of two *Amnios's* for two *Fetus's*, will never prove valid, even where *Twins*, and two *Amnios's* are found. Indeed any part may be made to grow to any part, as we see in the cure of *Hair lips*, &c. but then the *Fibres* must be first broke, before there can be any *Union*. Now I can't conceive what should naturally break the *Fibres* of the *Twins* in the *Uterus*. But although 'tis evident from what has been said, that *Twins* may lie distinct in the same *Amnios*, yet there must be as many *Urachus's*, as *Fetus's*. In these *Secundines* I saw two running over the *Placenta*, to the *Neck* of the *Allantois*, which I communicated to some Physicians, before the parts began to grow dry. The *Urachus* passes under the *Amnios* as the other *Umbilical Vessels* do, and runs from that part where the *Umbilical Rope* is set on to the *Placenta*, straight to the *Cervix*. F. S. describes the course of that *Urachus* marked R at F in the 2d *Fig.* The other *Urachus* lay about a quarter of an Inch laterally beyond that marked R in the same *Figure*. I mean by two *Urachus's*, two long roundish Bodies, of a depressed Figure, they seemed as big as a common Knitting-Needle, and were of a darker substance than the *Placenta* on which they lay. They appear'd in every respect like that part of the *Navel-string*, which is allowed by all Anatomists to be the *Urachus*, and in like manner shrunk in two or three days, from a Mucous substance to a meer Membrane.

These two are the only entire *Urinary* Membranes that I have prepared. Yet in the many *Secundines* that have come to my hands, I have ever found three distinct Membranes easily separable.

Perhaps some less curious Persons may think such *discoveries* as these of no use. But these may consider that hence we can better explain some *Phænomena*, as voiding *Urine* by the *Navel*, and the *Breaking of Waters* from Women half gone with Child, and tell the consequences of such accidents ; as also better account for those *Waters*, and *Bladders* Midwives meet with, and direct them in their doubtful Operations, &c. 'Tis something likewise to have cleared Points thus long controverted by the greatest Anatomists, &c.
